

## ABSTRACT

This invention is a management protection circuit to be used with a battery pack to prevent the charging or discharging of the battery from exceeding the upper and lower voltage thresholds. The over-discharging protection adopts a high accuracy, low power consumption, four OP AMPs comparison circuit. Its static working current is less than 0.3mA. The charging balance protection adopts a combined circuit of a high accuracy, low power consumption, four OP AMPs comparison circuit and a direct current inverter. When any of battery units in a battery pack reaches the upper voltage threshold of charging condition, the inverter goes into an active state and takes the charging electrical energy back to the charging system. Thus, the electrical energy can be fully utilized. It also reduces the temperature raised on the charging system and increases the system's reliability.